

# Assessing Typhoon Risk Using Multi-model Ensemble Forecasts for Disaster Risk Reduction

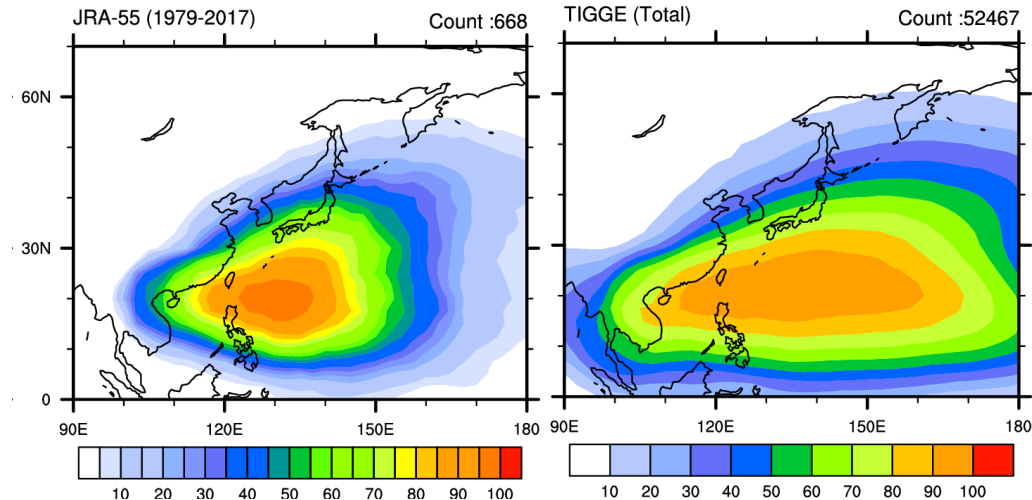
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- Western North Pacific Typhoons cause significant loss of life and property (>67 Billion RMB economic losses in 2018)
- One way of mitigating negative impacts on several sectors of society is the development and application of financial instruments for risk transfer and adequate response, e.g. parametric insurance.
  - A robust and reliable assessment of real typhoon hazard risk is needed.
- We have developed a method to construct an event set of high impact typhoon by using non-realised but forecast typhoon in ensemble prediction system (EPS).
  - Data: THORPEX Interactive Grand Global Ensemble (TIGGE)
  - Tracking algorithm: WiTRACK

Source	# of mem	Initialisations per day	Resolution (deg x deg)	Forecast lead time (hr)
CMA	14	2	0.5625x0.5625	240 360
ECMWF	50	2	0.5625x0.5625	360
NCEP	20	4	1x1	384
JMA	50*	1 2	1.25x1.25	216 264

**Track density of JRA-55 (1979-2017) [Left] and TIGGE [Right]**

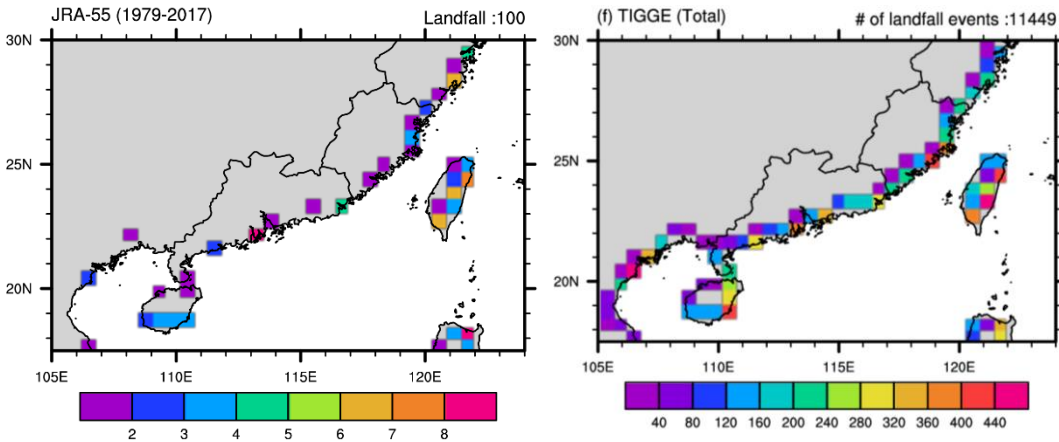


**Our published paper:**

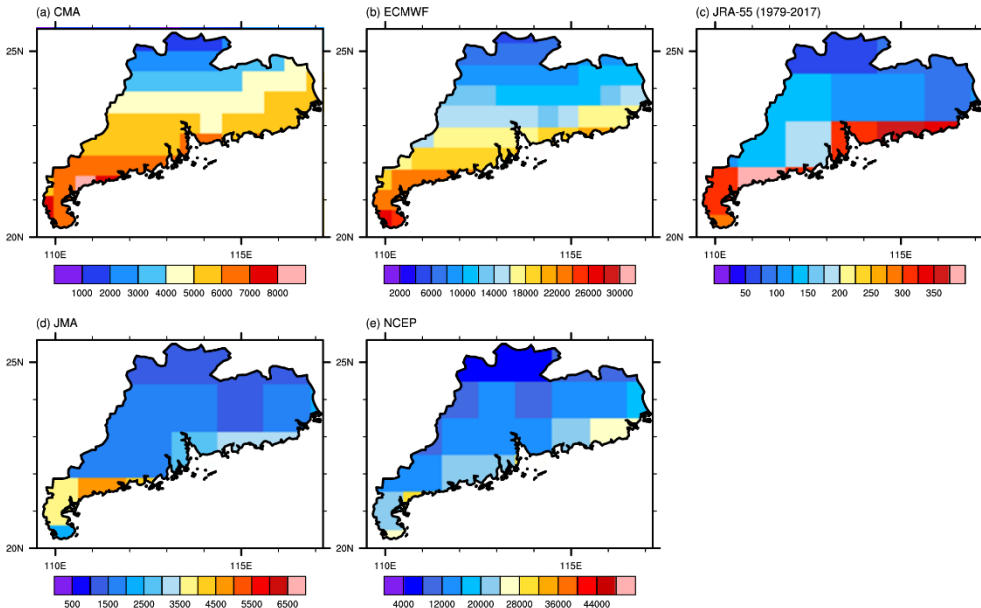
Ng, K. S. and Leckebusch, G. C.: A New View on Risk of Typhoon Occurrence in the Western North Pacific, Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2020-74>, in review, 2020.

# Results

## Number of landfall events with at least typhoon strength

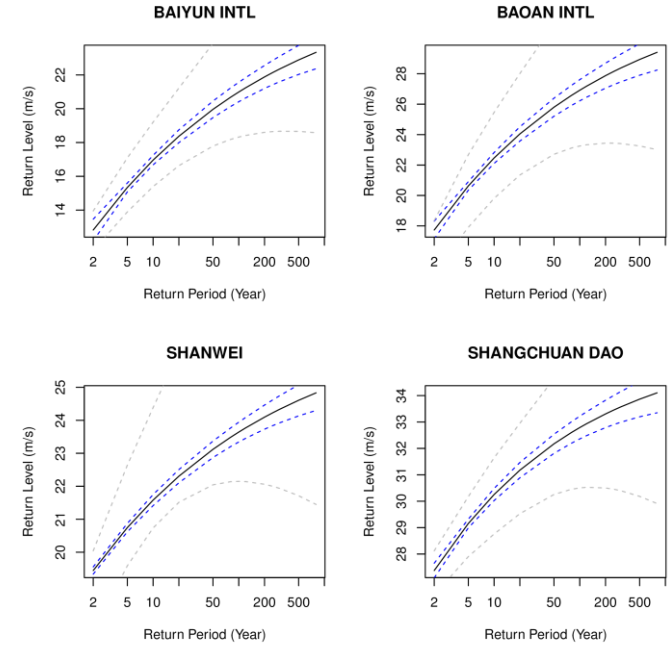


## Number of typhoon related SSI entries in each grid box



# Application

## Return period estimation



Return period estimate based on TIGGE event set (Black)  
 95% confidence interval calculated using TIGGE PEPS event set (Blue)  
 95% confidence interval calculated using OBS data (Grey)

# Summary

- The use of pure EPS typhoon in TIGGE for more robust TC risk assessment
- ➔ More physically consistent events (more than 10,000 years of data)
- ➔ Spatially consistent with historical distribution
- ➔ Physically consistent typhoon-related precipitation information available